

RECONFIGURABLE BIT-MANIPULATION NODE

ABSTRACT OF THE DISCLOSURE

A reconfigurable bit-manipulation node is disclosed. The node includes an execution unit configured to perform a number of bit-oriented functions and a control unit configured to control the execution unit to allow one of the bit-oriented functions to be performed. The execution unit includes a number of elements interconnected with one another to allow the bit-oriented functions to be performed. The elements includes a programmable butterfly unit, a number of non-programmable butterfly units, a number of data path elements, a look-up-table memory and a reorder memory. The execution unit is capable of engaging in one of a number of operating modes to perform the bit-oriented functions. The operating modes include a programmable mode and a number of fixed operating modes including Viterbi decoding, turbo decoding and variable length encoding and decoding. The data path elements include a programmable shifter and a programmable combiner. The programmable shifter is programmable on a cycle-by-cycle basis and configured to perform an exclusive-or function on multiple shifted versions of its inputs. The programmable shifter is further programmable to implement a parallel linear feedback shift register which may be maskable. The programmable combiner is configured to perform packing on an input having variable input lengths to generate an output word having variable output lengths. The programmable combiner is further configured to perform bit interlacing and bit puncturing. Packing, bit interlacing and bit puncturing can be performed concurrently.

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